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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/032,721	12/27/2001	Yukiko Kubota	010951	6364
2346	7590	09/04/2003		
BUCHANAN INGERSOLL, P.C. ONE OXFORD CENTRE, 301 GRANT STREET 20TH FLOOR PITTSBURGH, PA 15219			EXAMINER BERNATZ, KEVIN M	
			ART UNIT 1773	PAPER NUMBER 7
DATE MAILED: 09/04/2003				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/032,721	KUBOTA ET AL.	
	Examiner Kevin M Bernatz	Art Unit 1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-19 is/are pending in the application.
 - 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-4,6-8 and 11-14 is/are rejected.
- 7) Claim(s) 5,9,10,12 and 15-19 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All
 - b) Some *
 - c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 - a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ .
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>1,5</u> .	6) <input type="checkbox"/> Other: _____ .

DETAILED ACTION

Response to Amendment

1. Preliminary amendments to the specification, filed on October 27, 2001, have been entered in the above-identified application.

Examiner's Comments

2. The limitation "graded" in claim 14 has been interpreted based on applicants' as-filed disclosure (*Paragraph 0010*). Namely, "graded" has been interpreted to mean "this initial film is paramagnetic at room temperature and does not exchange link neighboring grains".

Claim Objections

3. Claims 12 and 16 are objected to because of the following informalities: "Cobalt and chromium – 40" is not a commonly accepted method of claiming a specific composition. Applicants are suggested to rewrite the claim similar to Paragraph 0010, i.e. "CoCr₄₀". Appropriate correction is required.
4. Claims 5, 9, 10 and 15 – 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1 – 3 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Tang et al. (U.S. Patent No. 5,750,270).

Regarding claims 1 – 3 and 11, Tang et al. disclose a magnetic recording medium having a substrate (*Figure 1, layer 30*) a magnetic layer (i.e. applicants' "interlayer") (*layer 31 and col. 9, lines 9 - 21*), and a layer of magnetic recording material thereon, the magnetic recording material comprising a plurality of bilayers having Cobalt or a Cobalt alloy according to claim 11 and a noble metal, such as Pt or Pd (*layers 34 and 35 and col. 9, line 44 bridging col. 10, line 15*).

7. Claims 1 – 3 and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Ikeda et al. (U.S. Patent No. 6,468,670 B1).

Regarding claims 1 – 3 and 11, Ikeda et al. disclose a magnetic recording medium having a substrate (*Figure 1, "Substrate"*) a magnetic layer (i.e. applicants' "interlayer") ("CoCr Granular Layer" and col. 2, lines 7 - 15), and a layer of magnetic

recording material thereon, the magnetic recording material comprising a plurality of bilayers having Cobalt or a Cobalt alloy according to claim 11 and a noble metal, such as Pt or Pd (“*Co/Pt Multilayer*”; col. 3, lines 17 – 20; and col. 5, lines 17 - 20).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 4, 6 – 8, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang et al. as applied above, and further in view of Suzuki et al. (U.S. Patent No. 5,587,235) and Soeya et al. (U.S. Patent No. 5,726,838).

Regarding claims 4, 13 and 14, Tang et al. is relied upon as described above.

Tang et al. fail to disclose an initial paramagnetic layer between the soft magnetic layer and the plurality of bilayers of Cobalt and a noble metal.

However, Suzuki et al. teach that it is known in the art that providing a paramagnetic intermediate layer between two adjacent magnetic layers, it is possible to reduce the medium noise during recording/reproducing operations (col. 2, lines 18 - 22; col. 2, line 53 bridging col. 3, line 38; col. 3, line 60 bridging col. 4, line 9).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Tang et al. to include a paramagnetic intermediate layer (i.e. applicants' “initial paramagnetic layer”) between the two adjacent

magnetic layers (*Tang et al.*, *layer 31 and {layers 34/34}_n*) as taught by Suzuki et al. since such a paramagnetic intermediate layer makes it possible to reduce the medium noise during recording/reproducing operations.

The limitation “does not exchange link adjacent grains” associated with the limitation “graded” (see Paragraph 2, above) is a functional limitation(s). As defined in the MPEP, “[a] functional limitation is an attempt to define something by what it does, rather than by what it is (e.g., as evidenced by its specific structure or specific ingredients). There is nothing inherently wrong with defining some part of an invention in functional terms. Functional language does not, in and of itself, render a claim improper. *In re Swinehart*, 439 F.2d 210, 169 USPQ 226 (CCPA 1971)” – MPEP § 2173.05(g). However, the examiner notes that “where the Patent Office has reason to believe that a functional limitation asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be an **inherent characteristic of the prior art**, it possesses the authority to require the applicant to prove that the subject matter shown to be in the prior art does not possess the characteristics relied on” (emphasis added) - MPEP § 2183.

In the instant case, the claimed limitation(s) “does not exchange link adjacent grains” is a functional limitation(s) and is deemed to be necessarily present in the prior art intermediate layer since the prior art intermediate layer is substantially identical in composition and/or structure. The Examiner’s sound basis for this assertion is that both the claimed and prior art layers are paramagnetic, and the Examiner notes that exchange coupling forces are only associated with adjacent ferro/ferri-magnetic

grains/materials, not paramagnetic or non-magnetic grains/materials (see Soeya *et al.*, col. 13, lines 3 – 7 and col. 16, lines 31 – 37). Since the layer is paramagnetic and not ferro/ferri-magnetic, the layer would not possess exchange linking/coupling forces between adjacent grains or layers.

Regarding claims 6 - 8, Tang et al. disclose Co and noble metal bilayers meeting applicants' claimed thickness and lamination number limitations (col. 9, line 64 *bridging* col. 10, line 24 and Examples).

10. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tang et al. as applied above, and further in view of Takano et al. (J. App. Phys., 87(9), 2000, 6364 – 6366).

Tang et al. is relied upon as described above.

Tang et al. fail to disclose a CoCr₄₀ alloy.

However, Takano et al. teach that the amount of chromium in a {CoCr/Pt}_n multilayer can be varied from 0 to 60% to effect the Kerr rotation angle and magnetic properties (*Figure 3 and Section III*). Therefore, the Examiner deems that it would have been obvious to one having ordinary skill in the art to determine an amount of Cr in a CoCr alloy meeting applicants' claimed composition limitation by optimizing the results effective variable through routine experimentation. *In re Boesch*, 205 USPQ 215 (CCPA 1980); *In re Geisler*, 116 F. 3d 1465, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997); *In re Aller*, 220 F.2d, 454, 456, 105 USPQ 233, 235 (CCPA 1955).

11. Claims 4, 6 – 8, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda et al. as applied above, and further in view of Suzuki et al. ('235) and Soeya et al. ('838).

Regarding claims 4, 13 and 14, Ikeda et al. is relied upon as described above. Ikeda et al. fail to disclose an initial paramagnetic layer between the soft magnetic layer and the plurality of bilayers of Cobalt and a noble metal.

However, Suzuki et al. teach that it is known in the art that providing a paramagnetic intermediate layer between two adjacent magnetic layers, it is possible to reduce the medium noise during recording/reproducing operations (*col. 2, lines 18 - 22; col. 2, line 53 bridging col. 3, line 38; col. 3, line 60 bridging col. 4, line 9*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Ikeda et al. to include a paramagnetic intermediate layer (i.e. applicants' "initial paramagnetic layer") between the two adjacent magnetic layers (*Ikeda et al., "CoCr Granular Layer" and "Co/Pt Multilayer"*) as taught by Suzuki et al. since such a paramagnetic intermediate layer makes it possible to reduce the medium noise during recording/reproducing operations.

In the instant case, the claimed limitation(s) "does not exchange link adjacent grains" is a functional limitation(s) and is deemed to be necessarily present in the prior art intermediate layer since the prior art intermediate layer is substantially identical in composition and/or structure. The Examiner's sound basis for this assertion is that both the claimed and prior art layers are paramagnetic, and the Examiner notes that exchange coupling forces are only associated with adjacent ferro/ferri-magnetic

grains/materials, not paramagnetic or non-magnetic grains/materials (see Soeya *et al.*, col. 13, lines 3 – 7 and col. 16, lines 31 – 37). Since the layer is paramagnetic and not ferro/ferri-magnetic, the layer would not possess exchange linking/coupling forces between adjacent grains or layers.

Regarding claims 6 and 7, Ikeda et al. disclose Co and noble metal bilayers meeting applicants' claimed thickness and lamination number limitations (col. 3, lines 63 – 67).

Regarding claim 8, the number of laminations is a known results effective variable in terms of the overall magnetic properties (*Ikeda et al.*, col. 3, lines 63 – 67: *medium A, n = 10 and medium B, n = 16; and Figures 2 and 3*). The Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as the number of laminations through routine experimentation, especially given the teaching in Ikeda et al. regarding the effect of using 10 and 16 laminations on the magnetic properties of the medium.

12. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda et al. as applied above, and further in view of Takano et al. (J. App. Phys., 87(9), 2000, 6364 – 6366).

Ikeda et al. is relied upon as described above.

Ikeda et al. fail to disclose a CoCr₄₀ alloy.

However, Takano et al. teach that the amount of chromium in a {CoCr/Pt}_n multilayer can be varied from 0 to 60% to effect the Kerr rotation angle and magnetic properties (*Figure 3 and Section III*). Therefore, the Examiner deems that it would have been obvious to one having ordinary skill in the art to determine an amount of Cr in a CoCr alloy meeting applicants' claimed composition limitation by optimizing the results effective variable through routine experimentation.

Allowable Subject Matter

13. The following is a statement of reasons for the indication of allowable subject matter: claims 5, 9, 10 and 15 – 19 recite the limitation "wherein the initial paramagnetic layer comprises a Cobalt alloy having a thickness of about 0.9 Å", which is neither taught, nor rendered obvious, by the prior art of record. While the prior art of record teaches using a paramagnetic layer between two magnetic layers for a reduction in medium noise, the prior art of record fails to teach or render obvious a paramagnetic layer possessing the claimed thickness limitation.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yamane et al. (U.S. Patent No. 5,604,030) teach {Co/Pt}_n superlattice structures wherein the Co layers are "in the range of 1 angstrom to 15 angstroms inclusive", but is silent about using different thicknesses in the same medium or intentionally forming paramagnetic Co layers (col. 4, lines 64 - 67). Coffey et al. (U.S.

Patent App. No. 2002/0192506 A1) and Kikitsu et al. (U.S. Patent App. No. 2001/0051287 A1) teach magnetic recording media with two separate superlattice structures having different thickness values for the Co and noble metal layers (*Coffey et al. – Paragraphs 0059 to 0061; Kikitsu et al., Paragraphs 0320 – 0323*), but are silent about forming paramagnetic layers and are not available as prior art since both Coffey et al. and Kikitsu et al. are antedated by the filing date of applicants' provisional application.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (703) 308-1737. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Thibodeau can be reached on (703) 308-2367. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.



Kevin M. Bernatz
Patent Examiner

August 27, 2003